

## NOTES

*CRUPINA VULGARIS* CASS. (ASTERACEAE: CYNAREAE), ESTABLISHED IN SONOMA COUNTY, CALIFORNIA AT ANNADEL STATE PARK.—Liam H. Davis and Robert J. Sherman, Biology Department, Sonoma State University, Rohnert Park, CA 94928.

*Crupina vulgaris* Cass. is native to the eastern Mediterranean region of Europe and is an economic pest to rangeland in southern Russia. In 1969 this weedy species became established in North America in Idaho. By 1989 *C. vulgaris* had invaded 9300 ha of rangeland in northcentral Idaho and 405 ha of rangeland in northeastern Oregon. It is now listed as a federal noxious weed.

In 1975 a California infestation scattered over approximately 1 ha was eradicated from an abandoned field southeast of Bennett Valley Golf Course in the city of Santa Rosa, Sonoma County. This site is approximately 1 km from a present infestation of 6 ha of Annadel State Park and 4 ha of bordering cattle pasture. This infestation is in predominantly south-facing oak grassland with dry, steep, well drained soils.

Two European references (Tutin et al., *Flora Europaeae*. 1976; Davis, *Flora of Turkey and the east Aegean Islands*. 1975) provide descriptions of *C. vulgaris*. We have drawn upon these and the Annadel material to develop the following description:

*CRUPINA VULGARIS* Cass., *Dist. Sci. Nat.* 12:68 (1817). Syn. *Centaurea crupina* L., *Sp. Pl.* 909 (1753). Ic. Sibth. & Sm., *Fl. Graeca* 9: t. 900 (1837), as *Centaurea crupina*.

Annual herb with one or more slender erect stems from taproot. Stems 10–70 cm, unbranched except for inflorescence. Basal leaves ovate to oblong, dentate to entire, petiolate to sessile, scabrid; soon decaying. Cauline leaves pinnatisect, scabrid and sessile with lobes 0.5–1.5 mm wide, linear and denticulate, upper leaves decreasing in size; branches of corymb leafless. Involucre fusiform when young, expanding to obconical, 8–15 × 3–5 mm at anthesis, bracts imbricate, unequal, oblong-lanceolate, acute, light green, becoming purple distally with age. Capitula heterogamous, with 3–5 florets, inner hermaphrodite, outer sterile. Corolla regularly 5-lobed, purple to pinkish, exceeding involucre. Achenes 3–4 × 2–2.5 mm, puberulent at dark brown base, villous towards apex, subcylindrical, with orbicular median basal hilum. Pappus of several concentric series, outer rows grading from short, flattened bristles to blackish-brown barbellate bristles, 5–7 mm, the inner single series of 5–10 triangular-lanceolate, acute scales. Chromosome number  $2n=30$ .

We are investigating the invaded areas and comparing these habitats with those of the eastern Mediterranean, where *C. vulgaris* is native, to evaluate the species potential in Sonoma County. A study of the effects of grazing, non-grazing, fire, and fire exclusion, as well as a survey for additional infestations is anticipated. The Sonoma County Department of Agriculture, United States Department of Agriculture, California Department of Food and Agriculture, and California Department of Parks and Recreation are coordinating efforts to develop an effective eradication strategy. We express appreciation for the criticism and help from Dr. Charles F. Quibell, Biology Department, Sonoma State University.

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